

SECTION 52

REDUCTION GEARS AND CLUTCHES

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52.1 REFERENCES

(52A) **VOLUME V, OWNER - FURNISHED EQUIPMENT**

52.2 INTRODUCTION

This Section contains the Contractor Design and Provide general requirements for the Propulsion System Integration (PSI) Contractor's Reduction Gears and clutches, and supplements requirements specified in other Sections of the Technical Specification covering ancillary systems and component parts of the Propulsion System.

For WSF Fleet-wide Standardization purposes, End No. 1 of the Vessel shall always be considered the bow, and this designation shall delineate port and starboard, fore and aft wherever they are addressed in the Technical Specification.

52.3 GENERAL

Reduction Gears and clutches will be Owner - Furnished Equipment (OFE) as set forth in Reference (52A).

The Contractor shall receive and off-load the Reduction Gears and Clutches, shipped from the Propulsion System Integrator (PSI) Contractor. The Contractor shall conduct a thorough

inspection, with the WSF Representative in attendance, to identify any visible exterior damage to components and submit a written report to the WSF Representative. The units shall then be stored indoors and adequately protected from weather, damage, and deterioration in a heated, dry storage facility until such time as the units can be installed shipboard. Once installed shipboard, all equipment shall be adequately protected from physical damage and adverse environment as set forth in the *SECURITY AND SAFETY* Subsection in Section 1 of the Technical Specification.

The Contractor has total responsibility for installation and testing according to the PSI Contractor's requirements and the Technical Specification. The Contractor shall design and provide all necessary foundations, and installation and set-up for the Reduction Gears & clutches and provide all installation, alignment, piping systems, electrical services, set-up, and testing required to produce a complete and operational system as set forth under the different Sections of the Technical Specification, and as set forth in Reference (52A).

See Section 102 of the Technical Specification for applicable vibration criteria.

52.4 INSTALLATION ASSISTANCE

The PSI Contractor and the WSF Representative will provide the Contractor with on-site technical service and support personnel for the length of time and services as described in Reference (52A) and Section 101 of the Technical Specification. The technical service and support personnel will be to check and test the actual work done by the Contractor to ensure the installation conforms to the Technical Specification and the PSI Contractor's requirements.

BE ADVISED: The Contract Bid Support Package provides OFE documents and drawings in Reference (52A) that contain specific installation instructions setting forth mandated installation procedures and precautions. The Contractor shall provide designs and installations that, at a minimum, meet and address all instructions and requirements as set forth in the OFE documents and drawings.

In the event the Contractor requires additional service or assistance of the PSI Contractor's representative(s), the Contractor shall arrange for the PSI Contractor's services through WSF. The Contractor shall be responsible to WSF for all such additional costs.

The Contractor shall notify the WSF Representative no less than ten (10) calendar days in advance of the time(s) the PSI Contractor's representative(s) is required on-site. The Contractor shall provide to the WSF Representative a schedule of the anticipated need for the PSI Contractor's representative(s). The schedule shall be based on a normal weekday using day shift working hours. Any and all premium and/or overtime pay required shall be the sole responsibility, of and at the expense of, the Contractor.

NOTE: The presence of the PSI Contractor's representative(s) does not relieve the Contractor of the responsibility for proper equipment, component, or system

installation and testing. Any work undertaken by the PSI Contractor's representative(s) other than that described herein and in Section 101 of the Technical Specification, shall be done completely at the sole expense of the Contractor.

52.5 LUBRICATION

The Contractor shall provide all lubricants for the Reduction Gears. All oils shall be as required by the PSI Contractor's manufacturer field representative, as set forth in Reference (52A), and shall be the brand and the type as designated in WSF's current contract for lube oils, grease, and fuel oil.

Each Reduction Gear has all accessories mounted on the gearbox except for the Oil Cooler and electrically driven Duplex Oil Pump that will be shipped loose. These shall be located within the parameters as set forth in Reference (52A). The Contractor shall provide and install all interconnecting piping for the gear lubrication system, the clutch oil system, and the used oil system as set forth in Reference (52A).

Reduction Gear oil sensors and controls will be pre-wired to one (1) or more J-Boxes provided with and mounted each gearbox. Pressure switches sensing the output pressure of the mechanical pumps shall be wired such that, on the loss of *either* lube oil pressure *or* clutch oil pressure, the Electric Duplex Oil Pump will automatically start and stay energized until mechanical pressure is sensed at the outlet of *both* the lube oil and clutch oil mechanically driven pumps.

Power for the Electric Lube Oil Pump (480 Vac) shall be provided through a Motor Control Center (MCC) located each Reduction Gear Room. Control of this pump shall be from both the MCC located in each specific Reduction Gear Room and from a pushbutton station mounted on the EOS Control console. See Section 91 of the Technical Specification for additional MCC requirements.

The oil to be used shall also conform to the requirements of Section 50 of the Technical Specification.

52.6 ALIGNMENT AIDS AND MARKINGS

The Contractor shall provide all Reduction Gear and clutch alignment to the shafting covered in Section 53 of the Technical Specification. Alignment shall meet the requirements of Reference (52A) and the PSI Contractor's Reduction Gear field representative.

Design and provide jacking bolts and dogs on all foundations as required to move the Reduction Gears into proper final alignment. The Contractor shall provide body fitted bolts, chocking materials or shim packs, and reaming required on the mating surfaces as set forth in Reference (52A).

Alignment shall be coordinated to meet all the requirements of this Section, Section 50,

Section 51, and Section 53 of the Technical Specification.

52.7 SPARE PARTS AND INSTRUCTION MANUALS

Provide a list of recommended spare parts and special tools, for those items which are Contractor furnished, together with parts lists and instruction manuals necessary to maintain and service provided equipment and accessories in accordance with the requirements of Sections 86 and 100 of the Technical Specification.

52.8 TESTS, TRIALS AND INSPECTIONS

Tests and/or trials shall be provided in accordance with this Section and Section 101 of the Technical Specification, and the PSI Contractor's field representative, Reduction Gear Manufacturer's field representative and Propulsion Engine Manufacturer's field representative requirements.

Additional inspections shall be performed as defined in this Section and Section 1 of the Technical Specification, and in the PSI Contractor's field representative, Reduction Gear Manufacturer's field representative and Propulsion Engine Manufacturer's field representative procedures. (See Reference (52A)).

52.9 PHASE II TECHNICAL PROPOSAL REQUIREMENTS

The deliverables required by Section 100 of the Technical Specification and the Authoritative Agencies, shall be provided during the Phase II Technical Proposal stage of Work in accordance with the requirements of Section 100 of the Technical Specification.

52.10 PHASE III DETAIL DESIGN AND CONSTRUCTION REQUIREMENTS

The deliverables required by Section 100 of the Technical Specification and the Authoritative Agencies, shall be provided during the Phase III Detail Design stage of Work in accordance with the requirements of Section 100 of the Technical Specification.

Personnel training regarding the Reduction Gear shall be provided in accordance with Section 50 of the Technical Specification.

(END OF SECTION)